

THERMAL SOLAR ENERGY

FREIBURG (Germany)

Although the quality of the equipment and the efficiency of thermal solar systems has improved significantly over the last years, this kind of energy production has not achieved an important share of the European market. Nevertheless remarkable initiatives could emerge thanks to policies conceived and implemented at local level. This is typically the case of the Municipality of Freiburg im Breisgau, which received the title of green and solar capital of Germany.

GENERAL ASPECTS

Freiburg is a city of 198,000 inhabitants. It is located on the River Dreisam close to the Black Forest at the heart of the Breisgau region. The city is home to an important university and is also a major industrial, trading and tourist centre. It is regarded as the green capital of Germany. With more than 23% of the votes at the last municipal elections, the Green Party has reinforced its already strong position as stakeholder in the local political context.

Climatic data:

Hours of sunshine:	1,746 h/a
Solar radiation:	1,117 kWh/(m ² a)
Average annual temperature:	10.4 °C



CONTEXT



The debates concerning the construction of the nuclear power plant in Wyl in the 70s contributed to deeply transform the energy policy of the commune. By the mid-1980s, the Municipality of Freiburg was one of the first German local authority in setting up an urban energy planning concept in collaboration with Freiburger Energie- und Wasserversorgungs-AG (FEW), the municipal utility. This concept was aimed at defining the municipal energy policy for the next ten years. Emphasis was laid on renewable energy and energy savings. In 1996, the City Council adopted a global climate protection plan which integrates a first assessment and promotes a greater concern for ecological aspects.

According to this climate protection plan, thermal solar energy can contribute to avoiding CO₂ emissions in much greater proportions than any other renewable energy sources (163,000 t/year). The plan also indicates that solar energy is not yet competitive compared to fuel oil or gas. 15 recommendations for developing the use of solar energy have been presented to the Municipality by the consultancy Öko-Institut.

EXPERIENCE OF FREIBURG

The Municipality of Freiburg and the municipal energy company (FEW) are jointly responsible for implementing the municipal solar development programme. Being close to the customers, FEW can directly approach local consumers whereas the city council can play a direct role through its building stock and an indirect one by taking political decisions.

FEW's promotion programme

FEW supports the installation of collectors, including regulation and storage systems. Collectors must however be quality certified. Financial support stands at 230 Euro/m². Possible applicants are private individuals, SMEs and state-approved institutions. The promotion programme is financed by a 0.3 cent/kWh additional charge paid by households with the electricity bill. In addition to this, people can benefit from free and customised advice and can have price offers from installers analysed from a technical point of view. In 1998/99, 160 solar installations were thus promoted. The erection of photovoltaic installations was also encouraged through the awarding of subsidies for a total amount of 1,280 Euro/kW_p.

Information/Public relations

The Municipality and FEW are extremely active in the field of information and public relations: publication of "Freiburger Solarenergie Führer" and brochures, advertising in newspapers, specialised advice provided at the Advice Centre located in Freiburg. The co-operation contract between FEW and a local association for the promotion of solar energy in the region of Freiburg ("Förderverein Energie - und Solaragentur Regio Freiburg e.V.") is also worth mentioning. Together, they organise visits to solar installations for the attention of interested citizens. They also organise events in neighbourhoods, present exhibitions and manage the "Citizens' Solar Fund" (fund provisioned by volunteer citizens and aimed at developing photovoltaic solar energy).

Players involved

The Municipality of Freiburg deserves special attention for its efforts in setting up a local network of competencies which is extremely important and acknowledged as such in Germany: Kiepenheuerinstitut für Solarenergie, Fraunhoferinstitut für Solare Energiesysteme (ISE), International Solar Energie Society (ISES), Öko-Institut and Freiburger Solarfabrik, a company that has been producing photovoltaic arrays since May 1999. There are also good contacts with the associations of installers and citizens. Financial organisms established in the commune can provide partial financing at interesting rates for solar installations.

Difficulties encountered

Public awareness of energy and environmental problems in Freiburg is strong and well established. This explains the fact that the difficulties encountered mainly relate to the low cost-efficiency of solar installations and financial incentive for building solar installations



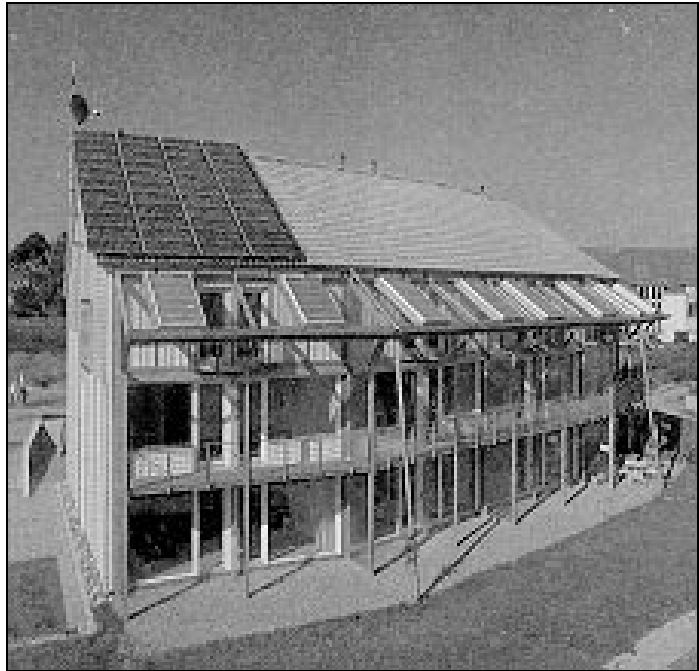
remains indispensable. The number of systems installed was indeed significantly lower when there was no promotion programme.

Achievements

Since the beginning of the 90s, the Municipality of Freiburg has been conducting an active policy in favour of solar energy promotion. The examples provided below are taken from the brochure "Freiburger Solarenergie-Führer".

Public buildings

- St. Michael's kindergarten (1991):
- Loretto baths: bath heating (500 m²)
- Gymnasiums at the Turnsee (1991) and Anne Frank (1993) schools: installation of vacuum tube collectors.
- Solar tower at the vocational school (1995): tower equipped for training, demonstration and research purposes.

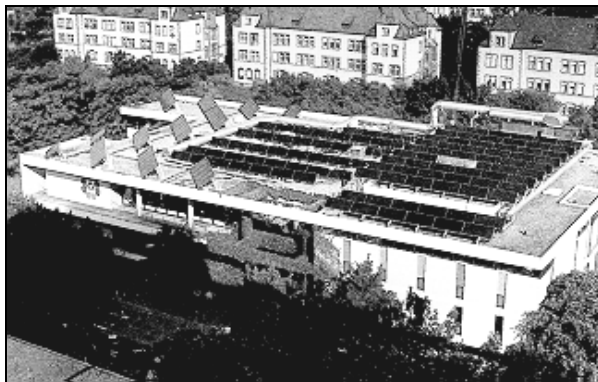


Munzingen solar garden (1994)

Low energy dwellings: 43 solar houses and 15 dwellings in a block of flats. Each house has 2 collectors of 4 m² for heating domestic water.

Dreisam stadium (1995)

Installed on the roof above the stands at the SC Freiburg stadium, 60 m² of solar collectors heat the water used for showers and a Jacuzzi. Around 60% (25 MWh/a) of hot water requirements are covered.



University clinic Casino of Freiburg (1995)

A photovoltaic installation (153 m²) and an air collector (272 m²) were installed on the clinic roof. The air collectors are used to warm up the air in winter and to heat the water in summer. Energy savings amount to 105 MWh per year for the air (15%) and 68 MWh per year (20%) for water heating.

Tannheim Villa (1994)

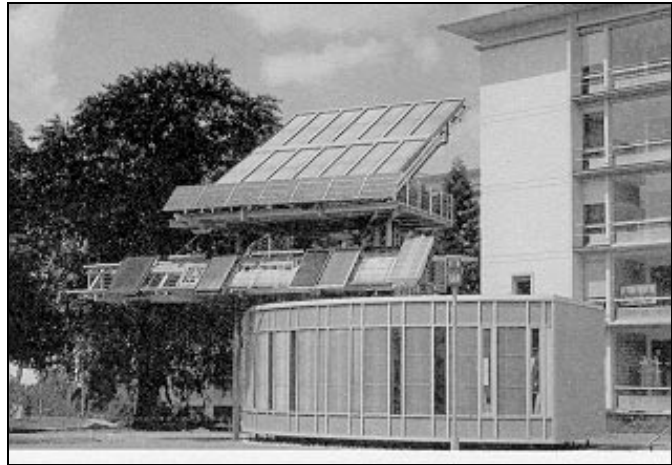
Energy retrofitting of an old villa by means of many innovative techniques, including a solar collector of 7.5m². The external aspect of the building has been preserved.

Experimental buildings

Freiburg is also famous for its experimental buildings made by several promoters, for example the energy self-sufficient solar house, the Freiburg Solar Centre, the Heliotrop solar house or the "Regiosolar" photovoltaic installation.

EVALUATION AND PERSPECTIVE

No quantified assessment of thermal solar installations in Freiburg has been carried out so far. Their number keeps on growing at a steady pace, according to an opinion poll conducted by FEW with companies specialising in this field. Since 1993, 30 to 40 new installations have been erected every year. The surface of installed solar collectors in Freiburg was estimated at 2,500m² (approx. 200 installations) at the beginning of 1996.



The success of the alternative energy policy promoted in Freiburg indirectly originates from the confrontation between politicians and citizens over the erection of the nuclear plant in Wyl that gradually turned into a constructive co-operation. The most committed leaders joined the political arena, the administration, the utilities, found a job in educational or research activities or founded green-spirited companies.

Despite the landslide success recently registered, the Municipality and FEW are determined to go even further in their commitment to developing solar energy over the next years. FEW plans to extend its promotion programme to the tertiary sector and to raise the promotion fund by increasing energy prices. In 1998, the priority will still be solar energy but in the following years other renewable energy sources will also benefit from promotional support.

The Municipality will provide promoters investing in innovative thermal solar techniques with well-oriented plots in new housing estates. Other points recommended in the climate protection concept should also be implemented.

FOR FURTHER INFORMATION

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